

## **Category: Agricultural Irrigation Engines**

An agricultural irrigation engine is an internal combustion engine that pumps water, either from a surface waterway or a well. Some irrigation engines also pressurize irrigation systems, such as sprinkler systems. Most irrigation engines are powered by diesel fuel, but there are also some fueled by natural gas, LP gas, propane, butane, and gasoline.

### **Emissions Inventory:**

The inventory for diesel irrigation engines was revised in April, 2003 by the ARB in cooperation with districts with agricultural interests. Local districts calculated their own emissions and engine populations; ARB compiled these inventories into a coherent statewide inventory. Overall, it was estimated that there were 8,212 engines statewide, of which 4,500 were in San Joaquin Unified APCD, 1,164 in the Sacramento Non-Attainment Area, and the remainder in other parts of the state.

The methodologies used by districts varied, but for all inventories emissions were calculated by multiplying the number of engines, the horsepower, the load factor, the annual hours of operation and the emission factor. The values for horsepower and load factor varied by district. For the SJUAPCD and the Sacramento Non-Attainment Area, the load factor was assumed to be 65%. For both areas, the annual hours of operation was around 1000 hours. Both areas accounted for emissions improvements due to Moyer Program engine repowers.

The inventory for diesel agricultural irrigation engines is currently being revised by the ARB as part of the proposed Air Toxics Control Measure (ATCM) for In-Use Agricultural Engines. This regulation will be heard by the ARB in November, 2006. The revised inventory will incorporate engine population data from the 2003 US Department of Agriculture Farm and Ranch Irrigation Survey.

The inventories for natural gas and LP gas engines were provided by air pollution control districts using a number of methodologies. These inventories will be revised by the ARB in the near future.

### **Input Data Sources:**

The input factors used for diesel irrigation engines come from various data sources:

<b>Input Factor</b>	<b>Source of Data (Diesel)</b>
<b>Population (base year 2003)</b>	District Permit Data, Moyer Program applications, district estimates
<b>Engine Horsepower</b>	Sonoma Technology (1996), District Permit Data, Moyer Program applications
<b>Engine Age</b>	Sonoma Technology (1996), ARB Carl Moyer Program Data
<b>Load Factor</b>	Sonoma Technology (1996), ARB Carl Moyer Program Data
<b>Emission Factors</b>	ARB OFFROAD Model Emission Factors
<b>Growth Factors</b>	CA Dept. of Water Resources Farmland Monitoring and Mapping Program

**Adopted Regulations for Agricultural Irrigation Engines:**

**2005:** San Joaquin Valley Unified APCD adopts rule 4702, setting standards for agricultural irrigation engines.

**2006:** Board hearing scheduled for stationary in-use agricultural engine Air Toxics Control Measure.

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